

What is claimed is:

Subj

1. A sintered ceramic igniter element comprising a conductive zone, a power booster zone, and a hot zone,
the booster zone having a PTCR and a resistivity greater than the conductive zone and less than the hot zone,
the hot zone having a resistivity greater than the booster zone.

2. An igniter element of claim 1 wherein the resistance of the booster zone permits i) current flow to the igniter hot zone and ii) resistance heating of the booster region during use of the igniter.

3. An igniter element of claim 1 or 2 wherein the resistance of the booster zone increases during application of current through the igniter and heating of the booster zone.

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4. An igniter element of any one of claim 1 through 3 wherein the igniter comprises in sequence the conductive zone, the booster zone and the hot zone.

5. An igniter element of any one of claims 1 through 4 wherein the three zones differ in operational temperature during use of the igniter.

6. An igniter element of claim 5 wherein the hot zone has a higher operational temperature than the booster zone, and the booster zone has a higher operational temperature than the conductive zone.

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7. An igniter element of claim 6 wherein the booster operational temperature is at least about 200°C higher than the operational temperature of the conductive zone.

8. An igniter element of claim 6 or 7 wherein the booster operational temperature is at least about 100°C less than the operational temperature of the hot zone.

Sub A5 9. An igniter element of any one of claims 1 through 8 wherein the room temperature resistivitance of the conductive zone is less than about 50 percent of the room temperature resistivitance of the booster zone.

10. An igniter element of any one of claims 1 through 9 wherein the room temperature resistivitance of the booster zone is less than about 70 percent of the room temperature resistivitance of the hot zone.

11. An igniter element of any one of claims 1 through 10 wherein the operational temperature resistivity of the booster zone is at least about 50 percent greater than the operational temperature resistivity of the hot zone.

12. A sintered ceramic igniter element comprising at least three zones of differing resistivity.

13. An igniter element of claim 12 wherein the three zones differ in operational temperature during use of the igniter.

Sub A5 14. A method of igniting gaseous fuel, comprising applying an electric current across an igniter an igniter of any one of claims 1 through 13.

15. A method of claim 14 wherein the current has a nominal voltage of 6, 8, 10, 12, 24, 120, 220, 230 and 240 volts.

16. A method of claim 14 or 15 wherein a hot zone of the igniter reaches at least about 1000°C within about one second of applying the current.

SWAP
17.
through 13.

A heating apparatus comprising an igniter of any one of claims 1

through 13.

18. The apparatus of claim 17 wherein the apparatus is an instantaneous water heater.

19. The apparatus of claim 17 wherein the apparatus is a cooking apparatus.

WAD

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80 81 82 83 84 85 86 87 88 89 90 91 92 93 94 95 96 97 98 99 100